forming a plurality of recessed regions within a thickness of the substrate, each of the recessed regions having a first exposed surface of a first crystallographic orientation and a second exposed surface of a second crystallographic orientation (see step **1530**); depositing masking material over at least the first exposed surface of each of the recessed regions (see step **1540**); depositing nucleation material over the second exposed surface of each of the recessed regions (see step **1550**); forming a thickness of gallium and nitrogen containing material overlying the nucleation material such that the thickness of gallium and nitrogen containing material fills each of the recessed regions to form a plurality of growth structures in each of the recessed regions (see step **1560**); coalescing the plurality of growth structures to form a resulting thickness of a gallium and nitrogen containing material overlying the major surface region of the predetermined area (see step **1570**); and releasing the resulting thickness of the gallium and nitrogen containing material from at least the major surface region (see step **1580**).

FIG. **16** depicts a block diagram of a system. As an option, the present system **1600** may be implemented in the context of the architecture and functionality of the embodiments described herein. The modules of the system can, individually or in combination, perform method steps within system **1600**. Any operations performed within system **1600** may be performed in any order unless as may be specified in the claims. The embodiment of FIG. **16** implements steps to perform: providing a gallium and nitrogen containing substrate having a wurtzite structure and a nonpolar or semipolar major surface orientation and comprising a one- or two-dimensional array of seed regions and coalescence fronts (see step **1620**); depositing at least one active layer on the gallium and nitrogen containing substrate, the active layer comprising nitrogen and at least one of gallium, aluminum, and indium (see step **1630**); and depositing n-type and p-type contacts in electrical communication with the active layer (see step **1640**).

While the above is a description of the specific embodiments, various modifications, alternative constructions and equivalents may be used. Therefore, the above description and illustrations should not be taken as limiting the scope of the appended claims.

What is claimed is:

1. A method for fabricating a gallium and nitrogen containing substrate comprising:

providing a gallium and arsenic containing substrate having a major surface region of a predetermined area;

forming a plurality of recessed regions within a thickness of the substrate, each of the plurality of recessed regions having a first exposed surface of a first crystallographic orientation and a second exposed surface of a second crystallographic orientation;

depositing masking material over at least the first exposed surface of each of the recessed regions;

depositing nucleation material over the second exposed surface of each of the recessed regions;

forming a thickness of gallium and nitrogen containing material overlying the nucleation material such that the thickness of gallium and nitrogen containing material fills each of the recessed regions to form a plurality of growth structures in each of the recessed regions;

coalescing the plurality of growth structures to form a resulting thickness of a gallium and nitrogen containing material overlying the major surface region of the predetermined area; and

releasing the resulting thickness of the gallium and nitrogen containing material from at least the major surface region.

2. The method of claim **1** wherein the predetermined area is greater than 15 square centimeters and the gallium and arsenic containing substrate is a GaAs wafer.

3. The method of claim **1** wherein the major surface region has an orientation within about 5 degrees of {110}.

4. The method of claim **1** wherein the major surface region has an orientation within about 5 degrees of an orientation chosen from {1 −1 0.7}, {1.22 −0.78 0.22}, {1 −1 2}, {1.43 −0.56 0.43}, {1 −1 3}, and {3 −1 1}.

5. The method of claim **1** wherein the second exposed surface is a non-(111)A surface.

6. The method of claim **1** wherein depositing nucleation material comprises a low-temperature process ranging from about 450 degrees Celsius to about 600 degrees Celsius.

7. The method of claim **1** wherein forming the thickness of gallium and nitrogen containing material comprises a high-temperature GaN epitaxial process selected from metalorganic chemical vapor deposition (MOCVD) and molecular beam epitaxy (MBE).

8. The method of claim **1** wherein the resulting thickness of a gallium and nitrogen containing material is between about 10 microns and about 10 millimeters.

9. The method of claim **1** wherein coalescing comprises forming the resulting gallium and nitrogen containing material by a hydride vapor phase epitaxy (HVPE) process.

10. The method of claim **9** wherein each of growth structures has an edge dislocation density at a coalescence front of less than about 10^4 cm^{-2}.

11. The method of claim **1** wherein a region of the resulting thickness of the gallium and nitrogen containing material has stacking faults with a concentration of less than about 10^4 cm^{-1}.

12. The method of claim **1** further comprising depositing at least one active layer on the gallium and nitrogen containing material, the active layer comprising nitrogen and at least one of gallium, aluminum, and indium.

13. The method of claim **12** wherein the plurality of recessed regions comprises a linear array of recessed regions and electrical contacts are configured so as to provide for light emission from the active layer positioned between the coalescence fronts of the growth structure.

14. The method of claim **12** wherein the plurality of recessed regions comprises a two-dimensional array of recessed regions and electrical contacts are positioned to provide for light emission from the active layer between the coalescence fronts of the growth structure.

15. The method of claim **12** wherein electrical contacts are placed on a defective region, wherein the defective region is a seed region or a region having stacking faults at a concentration of at least 10^1 cm^{-1}.

16. A method for fabricating a light emitting device, comprising:

providing a gallium and nitrogen containing substrate having a wurtzite structure and a nonpolar or semipolar major surface orientation and comprising a one- or two-dimensional array of seed regions and coalescence fronts;

depositing at least one active layer on the gallium and nitrogen containing substrate, the active layer comprising nitrogen and at least one of gallium, aluminum, and indium; and

depositing n-type and p-type contacts capable of conducting electrical current to and from the active layer.

17. The method of claim **16**, wherein the coalescence fronts comprise linear arrays of edge dislocations with a line density of at least about 10^2 cm^{-1}.